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## Raman / Batch Scale Ethylene Polymerization

Purpose: Test Raman &amp; probes in batch reactor in 96-G.

Laser Warm up 70  
 Delay 1  
 Delay/Acquisition 240  
 No. Acq 100

Time	Sample File	Comments
9:45	BR96G 0001 0002 0003 0004 0005 0006 0007 0008	Nitrogen at 100 psig. 30 sec acquisition, 33°C
		changed to 251 psig $N_2$ @ 33°C.

10:15 BR96G

all (30 sec) ↑  
 acquisition  
 time  
 before  
 arrow

10:20 BRIC4 0001

28°C, 68 psig isobutane, not stirred, pushed in with  $C_2$ 

BR96GIC4

Isobutane " R2000

BR96GIC4A

" " Galactos

BR96GIC4S700RPM

700 RPM, 59 psig, 28°C

BRStir

" " "

BR<sup>TE</sup>Stir

" " "

BRNoStir

Turned off stirring

BRStiragain

Turned stirring back on @ 700 rpm - 59 psig

11:15

BR00001

Adjusted temps to 60.1°C on IC4 in reactor. 1272 RPM = 69. psig

60 sec

Laser

Warm up

Post 2 sec

BR00002

Same as 0001

BR00003

Changed reactor temp to ~73°C during this scan, 74.0°F, P=172 psig

BR00004

Stable at 73.1°C, 169 psig

BR00005

Change T to 80°C on this scan; 80.6, 196 psig added.

BR00006

80.2°C, 195 psig, stable.

BR00007

Change to 90°C at pt: 91°C 242 psig

BR00008

Stable 90°C, 237 psig.

BR00009

Transition to 100°C, 100.5°C, 288 psig

BR00010

Stable 99.9 + 285 psig.

BR00011

Go to 105°C; 105.2, 315 psig

BR00012

Stable 105.3°C, 316 psig

BR00013

60.1, P=129 psig

BR00014

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## Raman / Bench Scale Ethylene Polymerization

R<sub>c</sub>

Purpose: Measure ethylene &amp; isobutane in liquid reactor contents. 12" probe

Time File

Stirrer On at 678 rpm

1400 BRExxxx Start at 60°C, add C<sub>2</sub> to iC<sub>4</sub> at 60°. 128 psig iC<sub>4</sub>  
 Put 200 psig C<sub>2</sub> for target total P = 328 psig at 60°C.

1416 BRE00001 T = 60.0°C, P = 330 psig (estimate 205 psig C<sub>2</sub>)

BRE00002 Stable at 60°C / 333 psig

BRE00003 Stable at 60°C / 333 psig

BRE00004 Change T to 60.5°C, Actual 73.8 &amp; 400 psig

BRE00005 ✓ 73.8°C 397 psig

BRE00006 Transition to 80°C. Actual = 438 psig T = 80.8

BRE00007 Stable at 80.1°C / 435 psig

BRE00008 Stable at 80.1°C / 435 psig

BRE00009 Transition to 90°C: 91.1°C / 500 psig Actual

BRE00010 T = 89.9°C P = 493 psig

BRE00011 T = 89.9°C P = 493 psig

BRE00012 T = 107°C P = 605 psig Shows fluorescence

BRE00013 T = 105°C P = 592 psig

BRE00014 T = 100.1 P = 579 psig

BRE00015 T = 100.7 P = 565 psig

all 5" BRE00016 Probe installed in reactor head  
 Changed to gas phase / 5" probe in mid-run. T = 99.9°C P = 537 psig

gas phase probe BRE00017 T = 99.8 P = 559

BRE00018 T = 80.6 P = 440

BRE00019 T = 80.2 P = 438

BRE00020 Changing in H<sub>2</sub> to determine if it can be detected.  
 140 psig DP. of a 340 cc vessel. P = 450<sup>472</sup> in reactor, now 422

BRE00021 Changed more H<sub>2</sub>, 225 psig DP more, P = 479 at 79.8°CBRE00022 Second spectrum at this condition. (wired result) Real high N<sub>2</sub> peak

12" probe BRE00023 Changed probe to 12" liquid probe  
 T = 80.2°C P = 487 psig

BRE00024 Repeat of 23, 36° &amp; 483 psig

BRE00025 Add more H<sub>2</sub>. DP = 225 psig, of a 340 ccBRE00026 T = 80.1 P = 535 psig, 0. see H<sub>2</sub> at 588 cm<sup>-1</sup>

BRE00027 T = 80 P = 533 repeat of 26.

BRE00028 T = 80 P = 533

BRE00029 T = 80 P = 533

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